

Introduction

The MICROLINE® 390 FLATBED Printer is a small, light and easy to connect device accepting a variety of papers. This Handbook will teach you the basic skills of the MICROLINE 390 FLATBED. Read the instructions carefully to take full advantage of your printer. Keep this Handbook and use it later as a reference book.

Chapter 1, Setting up your MICROLINE 390 FLATBED, shows you how to set up your printer, connect it to your computer and load paper.

Chapter 2, Cut-Sheet Feeder, shows you how to mount the cut-sheet feeder and how to operate it.

Chapter 3, The Control Panel Reference, describes the basic printing features and commands of the front panel, such as print quality, font, character pitch, etc.

In Chapter 4, Computer Control, you will find general guidelines on installing and running application software along with your printer, including some specific information on PC/MS-DOS. You will also find a few tips on BASIC which will enable you to write your own programs.

Chapter 5, Control Code Reference, lists the control codes for all of the printer's features necessary to reproduce the fonts available in Epson and IBM printers. It will also be useful when your own programming has some problems.

Chapter 6, Graphics and Custom Characters, describes how to program graphics and how to reproduce the fonts available in Epson and IBM printers. This chapter will help users who want to expand the capabilities of their MICROLINE 390 FLATBED printers.

Chapter 7 Cleaning and Troubleshooting, gives you information on how to keep your printer working efficiently. There is also a guide for troubleshooting.

Appendices A-D contains reference materials for control codes, character sets, interfacing and product specifications.

Chapter 1

Setting Up the MICROLINE 390 FLATBED

Prior to unpacking the printer, find a flat, sturdy surface to place it on, for example, a desk, printer stand, etc. Gently remove the printer from its carton. Make sure you have everything shown below:

- * MICROLINE 390 FLATBED printer
- * Sheet stacker
- * Power cord
- * Ribbon cartridge
- * Printer Handbook

Note 1: Save the box and all packing material. Repack the printer when planning to move it across long distances in order to protect it from rough handling and jostling.

Note 2: You can purchase an interface cable and paper for the MICROLINE 390 FLATBED from your dealer.

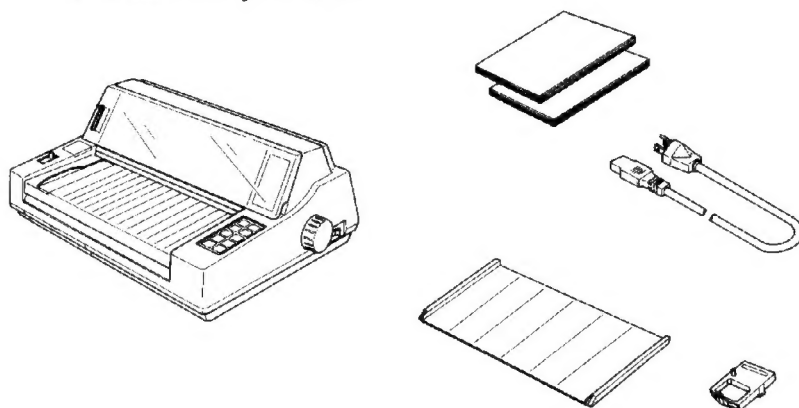


Figure 1. MICROLINE 390 FLATBED Printer and additional items

In the unlikely event that anything is missing or damaged, contact your dealer immediately.

Preliminaries

Before plugging in the printer, follow these steps to set up your printer.

1. Hold both sides of the access cover and open it up. (Figure 2-a)

There is a shipping stopper to protect the printhead from jamming. (To move the printer long distances, make sure to re-fasten the stopper.) Remove this shipping stopper. (Figure 2-b) and save it with other packing materials.

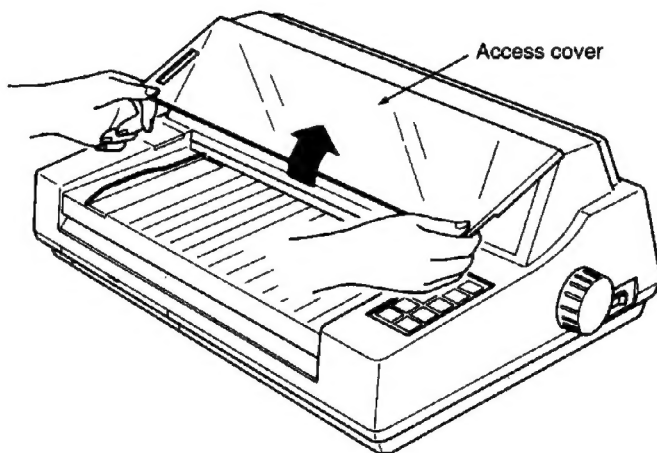
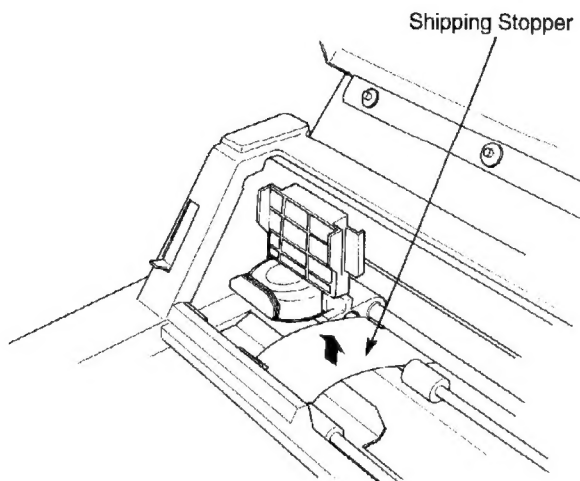
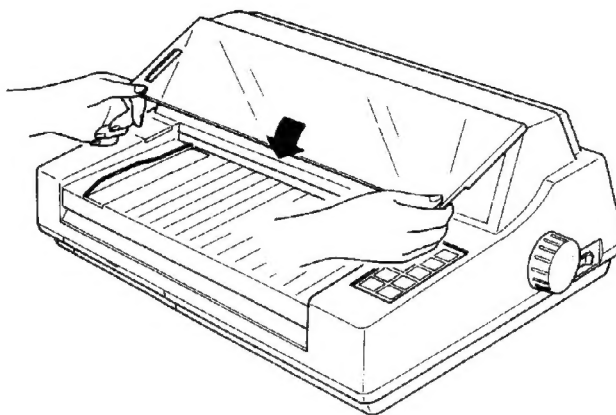


Figure 2-a. Open the Access Cover



b. Removing the Shipping Stopper



c. Closing the Access Cover

2. Install the sheet stacker:

Put the stud of one of the stacker's legs into the hole at the end of the rear vent. Gently press the other leg until it slips into the other hole.

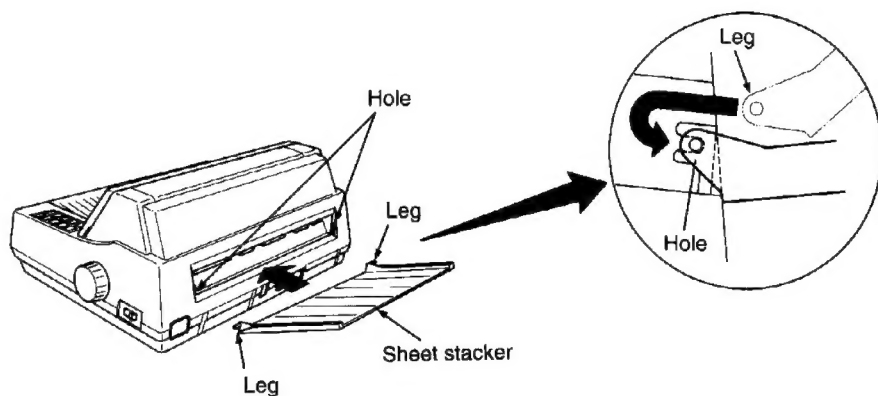


Figure 3. Installing the Sheet Stacker

3. Make sure the power switch is OFF. Plug the power cord into the back of the printer. Plug the other end into an earthed socket.
4. Turn the power switch on, and check that the POWER lamp and the ALARM lamp are illuminated. If paper is loaded, the POWER lamp and the SEL lamp will be illuminated.
5. Turn the power switch off.

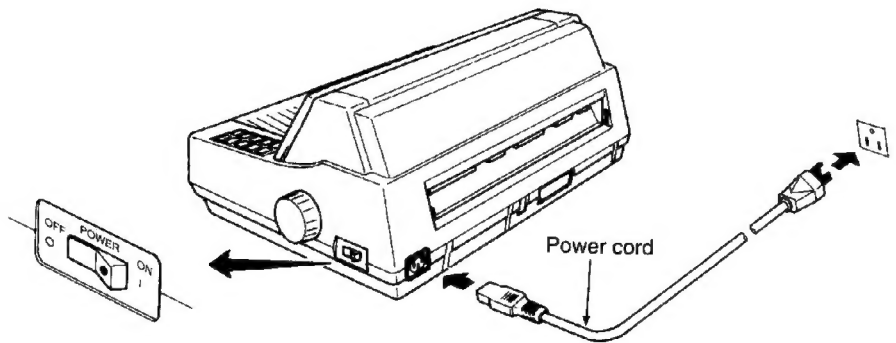


Figure 4. Connecting the Power Cord

Important: Make sure the socket is earthed. Do not use an adapter because it will defeat the earthing.

Connecting to the Computer

These instructions are for the standard parallel interface. If you have the optional serial interface, see the installation and connection details described later in Appendix C.

1. Make sure that both the printer and the computer power are OFF.

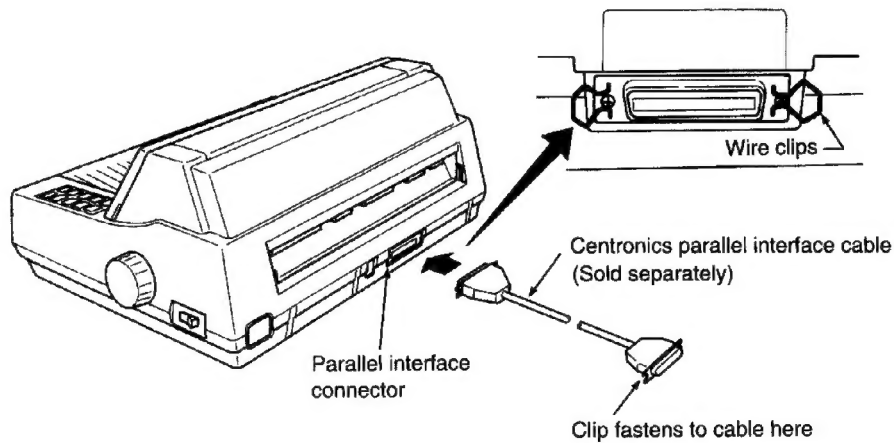


Figure 5. Connecting to the Computer

2. Plug the interface cable into the port on the back of your printer. Fasten the plug of the cable to the connector with wire clips; wire clips can be found on the both sides of the connector port.
3. Plug the other end of the cable into the printer port of your computer.

Installing the Ribbon Cartridge

1. Set the headgap lever to the "R" position.
2. Open the access cover.
3. Slide the ribbon cartridge gently towards the centre to give yourself some working room.

There is a cutting part at the centre of the bail for changing cartridges.

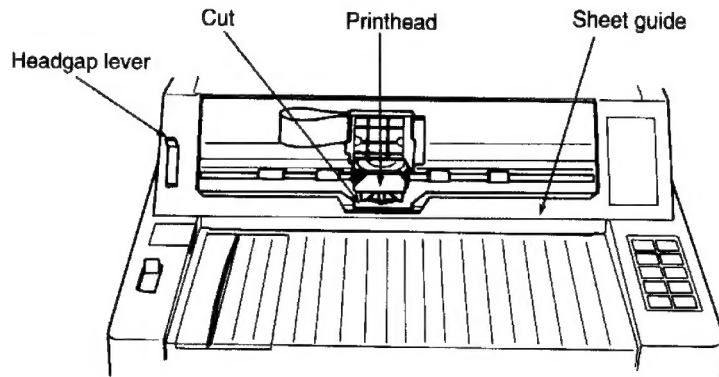


Figure 6. Moving the Printhead to the Centre of the Platen

Important:

- a) The printhead can get very hot during extended periods of printing—be sure to let it cool off before you touch it.
- b) Make sure that you are not using the wrong ribbon. It may cause print quality problems. Use only the grey cartridge with a letter "s" specifically designed for 24-pin printing of MICROLINE 390 FB.

4. Hold the ribbon cartridge with the blue take-up knob facing up. (Figure 7-a.)

5. Insert the flat end of the cartridge into the upper part of the ribbon plate, then lower the front of the cartridge over the printhead until it snaps into place. (Figure 7-b.)

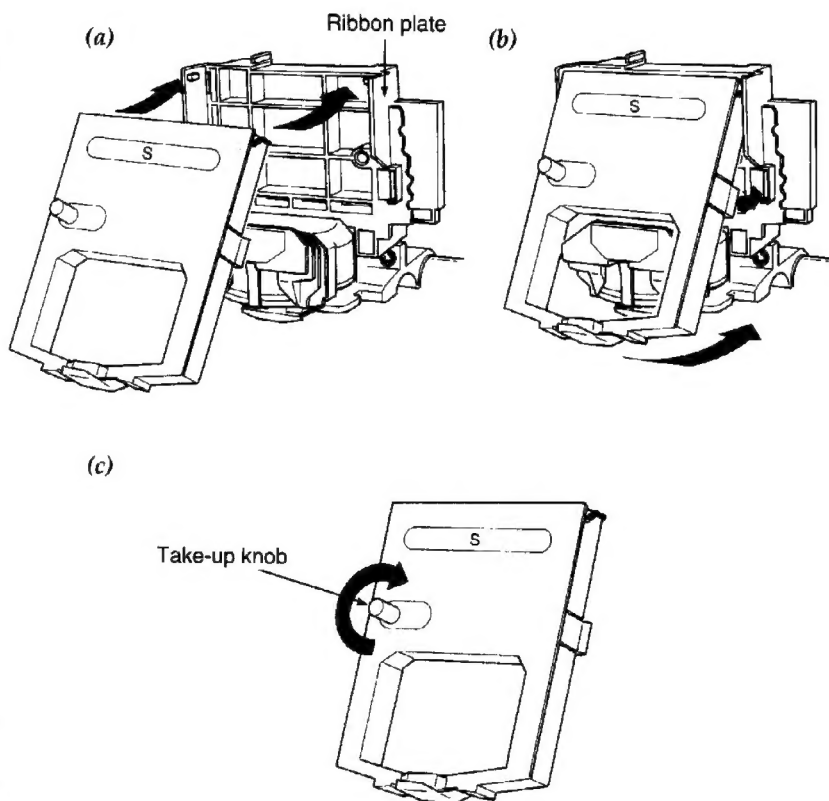


Figure 7. Inserting the Ribbon Cartridge

6. Turn the take-up knob in the direction of the arrow icon to tighten the ribbon. (Figure 7-c.)

7. To remove a ribbon, move the cartridge to the position indicated by two arrow icons at the bottom of the cartridge then lift it out gently.

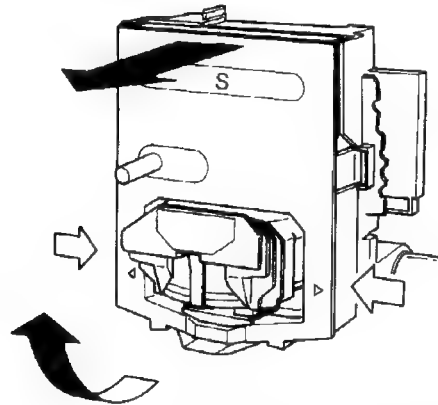
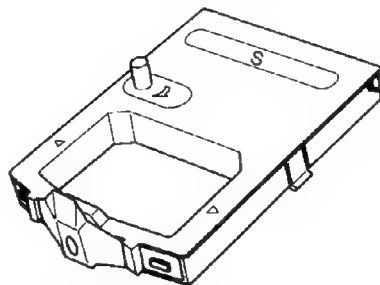
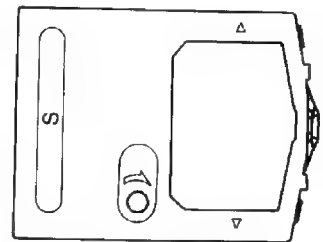


Figure 8. Removing the Ribbon Cartridge

Important: Do not peel off the plastic film (ribbon mask) on the top of the cartridge. (Figure 9-a.)
Be careful not to stock the ribbon cartridge sideways. It will cause unequal printing. (Figure 9-b.)



(a) Do not peel this film



(b) Do not stand to stock the cartridge

Figure 9. Ribbon Cartridge

Printable Area

Cut-Sheet Paper

Page Margins

Margin	Minimum	Maximum	Default
T: Top	2.1mm (0.083 inch)	377.8mm (15 inch)	6.35mm (0.25 inch)
B: Bottom	4.35mm (0.17 inch)		
L: Length	70mm (2.8inch)	420mm (16.5 inch)	
Le: Left	6.35mm (0.25 inch)	28.6mm (1.125 inch)	
W: Width	90mm (3.5 inch)	304.8mm (12 inch)	
Ri: Right	6.35mm (0.25 inch)		

* W: Max, 304.8mm (12 inch) is to be Le: 19.05 – 28.6mm (0.75 – 1.125 inch)

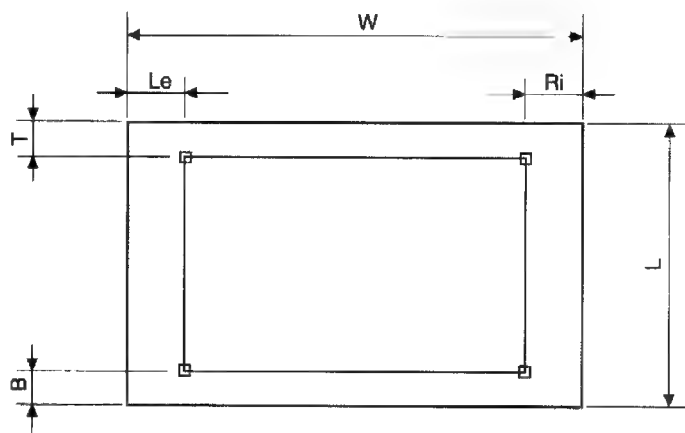


Figure 10

Continuous Paper

Page Margins

Margin	Minimum	Maximum
T: Top	6.35mm (0.25 inch) *1	
B: Bottom	6.35mm (0.25 inch)	
L: Length	76.2mm (3 inch) *1	355.6mm (14 inch)
Le: Left	6.35mm (0.25 inch) *2	22.2mm (0.875 inch)
Ri: Right	12.7mm (0.5 inch)	
W: Width	76.2mm (3 inch)	304.8mm (12 inch)

*1: Recommended to print from position 16.9mm (0.67 inch) from top.

*2: W: Max, 304.8mm (12 inch) is to be Le: 14 – 22.2mm (0.55 – 0.875 inch)

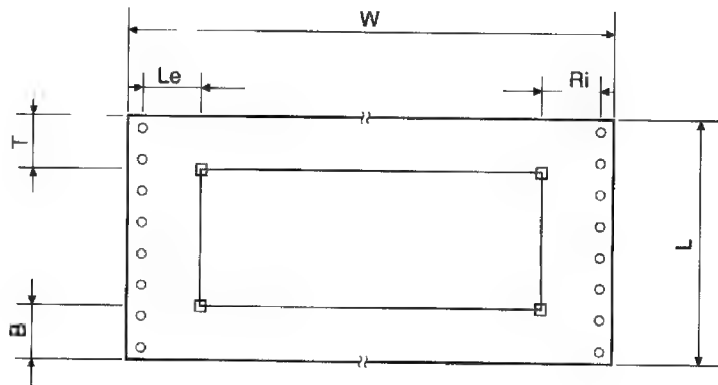


Figure 11

Loading Paper

*** Note :** Before starting this section, go through the description of the control panel in Chapter 2.

The MICROLINE 390 FLATBED printer can easily handle many different types of paper with push button ease. Check Chapter 6 for details on using various types of paper.

Loading Continuous Paper

1. Check that the POWER light is turned on.
2. Check that the SEL light is turned off. If it is lit, push the SEL button to turn it off.

*** Note :** You cannot print continuous paper and cut-sheets at the same time. If a cut sheet is already loaded, pull the paper lever forwards, and press the FORM FEED button while the SEL light is on. The cut sheet will feed automatically.

3. Push the paper lever to a backwards position. (Continuous paper position.)

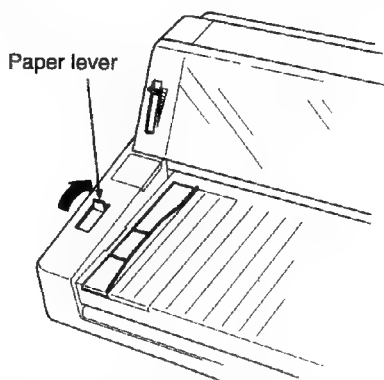


Figure 12. Pushing the Paper Lever Backwards (Continuous Paper Position.)

4. Adjust the headgap lever on the left side of the printer according to your paper thickness.

At its lowest (position 1), the lever sets a thickness for one sheet of paper. It clicks through seven positions showing the number of sheets. The eighth position is for extra-thick paper.

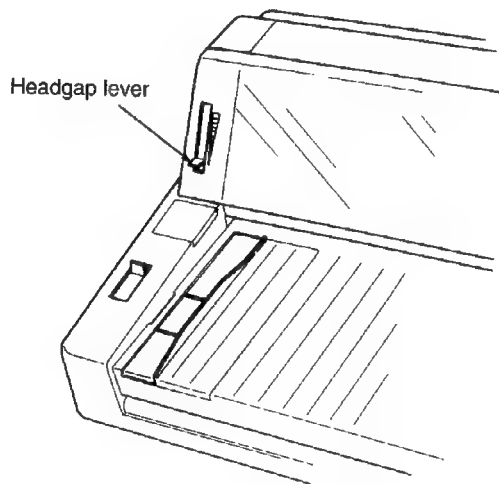


Figure 13. Adjusting the Headgap Lever

Note 1: In the positions above 5, the printer slows down to keep the print quality with thicker multipart forms.

Note 2: "R" position means ribbon cartridge replacement position.

5. Hold both sides of the table and lift it up gently.

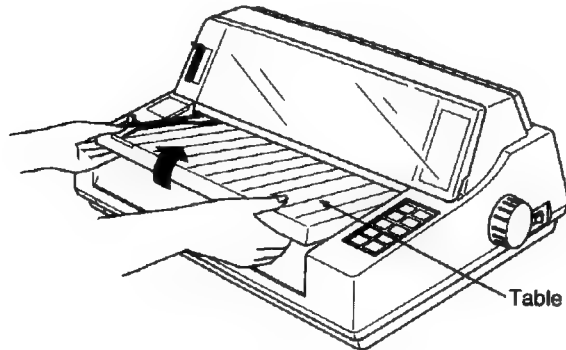


Figure 14. Opening the Table

6. Flip the lock levers on both pin-tractors into the up position. This unlocks the pin-tractor, so you can adjust it to the width of your paper. Slide the sheet supporter to the centre.

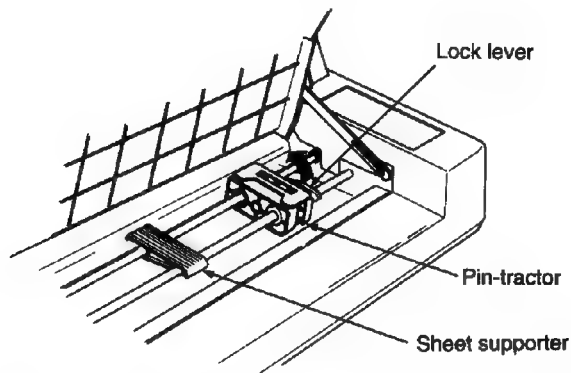


Figure 15. Moving the Pin-Tractors and the Sheet Supporter

7. Open both of the pin-tractors covers.

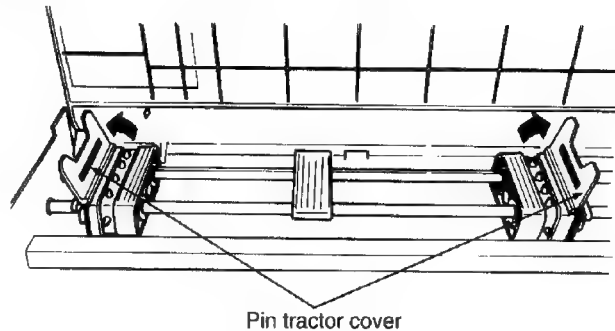


Figure 16. Opening the Pin-Tractors Covers

8. Lay down the continuous paper with printing face upwards on to the pin-tractors. Adjust the paper so that the first two pins of both pin-tractors poke through the two sprocket holes of the paper. Make sure that the paper covers the pin-tractors.

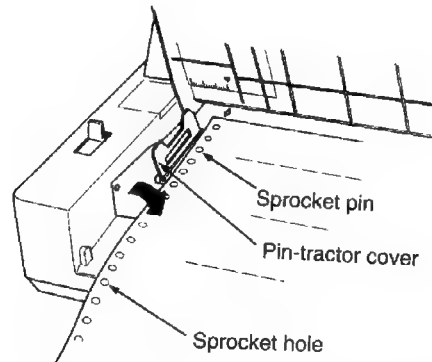


Figure 17. Setting the Paper on the Pin-Tractors

Important: The space between the left edge of the paper and the left end of the platen must be more than 1/2 inch. Check that your paper covers the notch on the platen. If it is not, a Paper Out alarm will light.

9. Check again that the holes fit into the pins correctly, then close the left pin-tractor cover. Flip the left lock lever into a backwards position. (Lock position.)

* **Note :** The arrow icon (▼) on the scale indicates the centre of the first printing character, (perforated line of the paper) and the centre of the diamond-shaped hole indicates the centre of the first printing character.

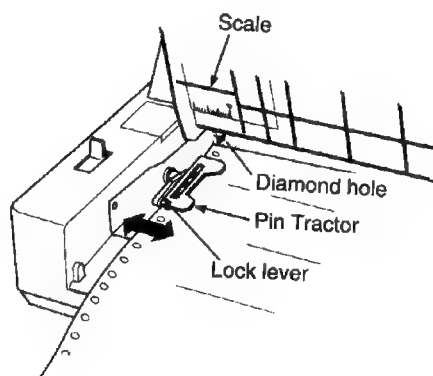


Figure 18. Closing the Left Pin-Tractor Cover and Relocking the Lever

10. Slide the right pin-tractor to tighten the paper properly. Press the right lock lever down. (Lock position.) Close the pin-tractor cover.

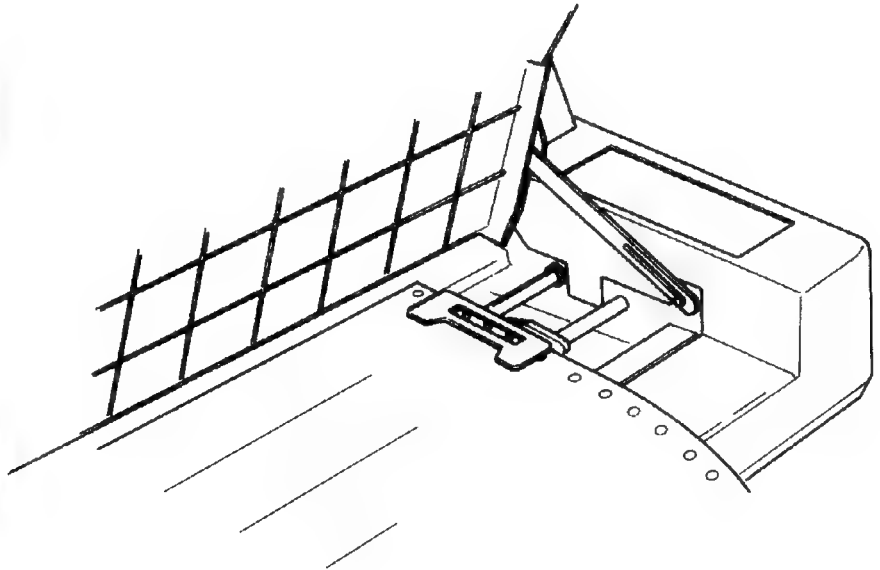


Figure 19. Closing the Right Tractor Cover

11. Close the table. The extension guide is not necessary when using continuous paper. Turn it clockwise so that it goes under the sheet stacker.

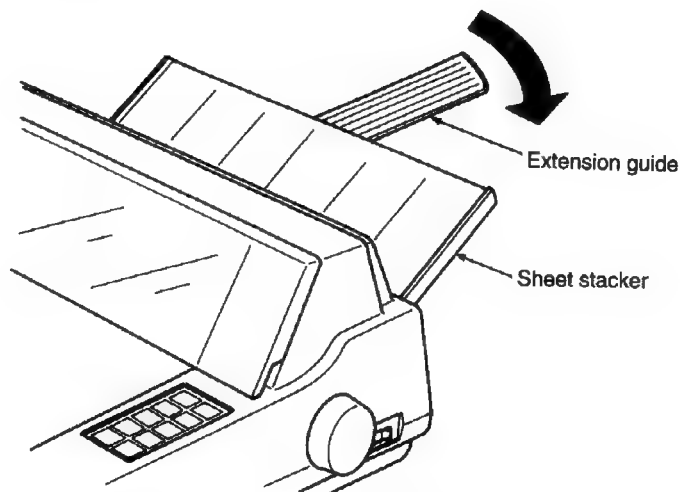


Figure 20. Setting the Extension Guide into the Sheet Stacker

12. When you close the table, the ALARM light comes on, but do not worry, it is just telling you that no paper is loaded.

Press the FORM FEED button. Your paper will be loaded automatically.

The ALARM light goes off, and SEL light comes on: you are ready to start printing.

Positioning the Printer

When printing a large amount of continuous paper, put your printer on a table around 75 cm high in order to store the paper. Make sure the paper flows straight to the printer.

Loading Cut-Sheet Paper

1. Check the power light is turned on.
2. Check that the SEL light is turned off. If it is lit, push the SEL button to make it go off.
3. Pull the paper lever to the forwards position. (Cut-sheet paper position.)

Note: You can not print cut sheets and continuous paper at the same time. In case continuous paper is already loaded, push the paper lever to its backwards position, and press the PAPER PARK button while the SEL light is on. The continuous paper will eject automatically.

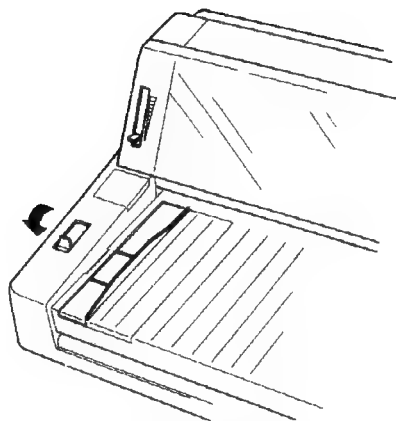


Figure 21. Pulling the Paper Lever to a Forward Position (Cut-Sheet Position)

4. Click the headgap lever to the appropriate position for your paper thickness.

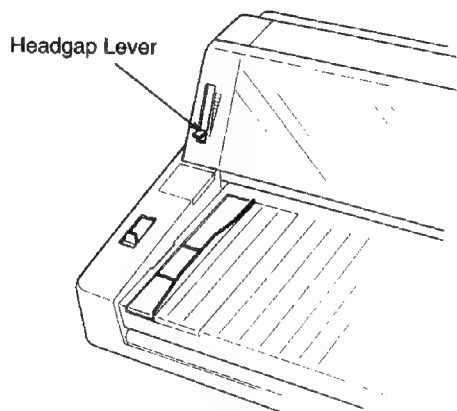


Figure 22. Adjusting the Headgap Lever

5. Place the cut-sheet along the paper guide with printing face upwards, and insert into the slot. The arrow icon (▼) indicates the centre of the first printing character.

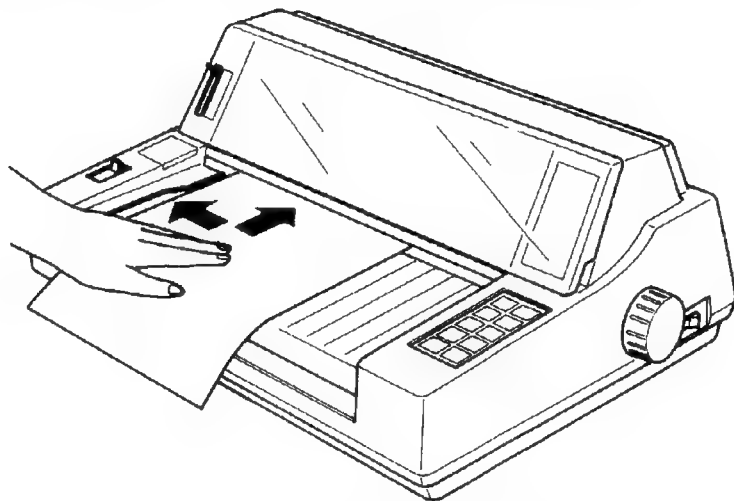


Figure 23. Inserting Cut Sheet Paper

Note: Unless you alter the standard margin setting by using the MENU MODE, the paper guide must be placed correctly against the arrow icon: too big a left margin may cause printing on the bare platen and a loss of data.

6. The sheet will be loaded automatically. The ALARM light goes off and SEL light comes on: You are ready to start printing.

Note: If the paper gets jammed, the ALARM light starts blinking. Open the access cover and remove the paper. Close the cover and press the SEL button. The light will stop blinking.

7. If the paper was not straight nor positioned correctly for printing, set the paper lever to backwards position (continuous paper position) to remove the paper, and try again.
8. When printing has finished, press the SEL button to deselect. (The SEL light goes off.)
Press the Paper Park button, and the last page will be ejected.

Setting the Top of Form

The MICROLINE 390 FLATBED can adjust the top of form (the first line of the printing surface) by 1/144 inch. This allows you to set a desired top of form very precisely.

1. To advance the paper, keep pressing the TOF/QUIET button and press the FORM FEED button.
2. To reverse, keep pressing the TOF/QUIET button and press the LINE FEED button.

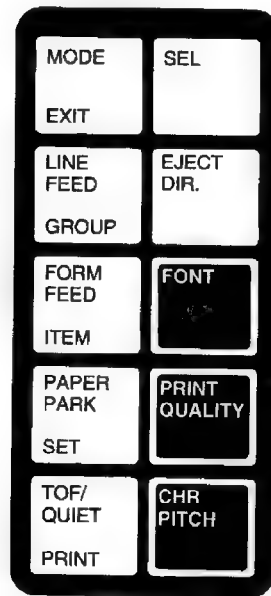


Figure 24. Setting Top of Form

3. Release the two buttons at the desired top of form position. Press the TOF/QUIET button again to fix the setting. It remains in the printer's memory and will not change until the resetting.

Note 1: The reverse process is limited in order to avoid paper jams.

Note 2: You can also preset the top of form by hand. Make sure the SEL light is out, and turn the platen knob.

Important: Make sure the paper is in deep enough for the platen to grip it. If not, the bail may catch the paper and cause jamming.

Positioning of the Printer

1. When printing large amounts of continuous paper, set your printer on the table around 75 cm high in order to store the paper.
Make sure the paper feeds straight to the printer.

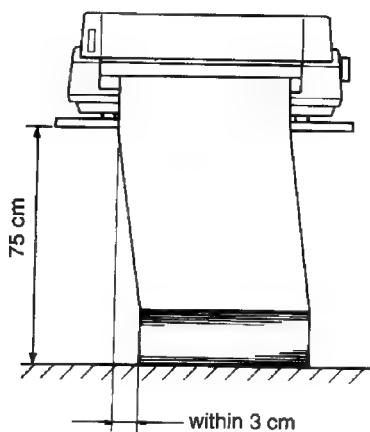


Figure 25. Positioning of the Printer

2. Also, keep printer 60 cm or more from the wall in order to store paper. These storage requirements are necessary to avoid jamming.

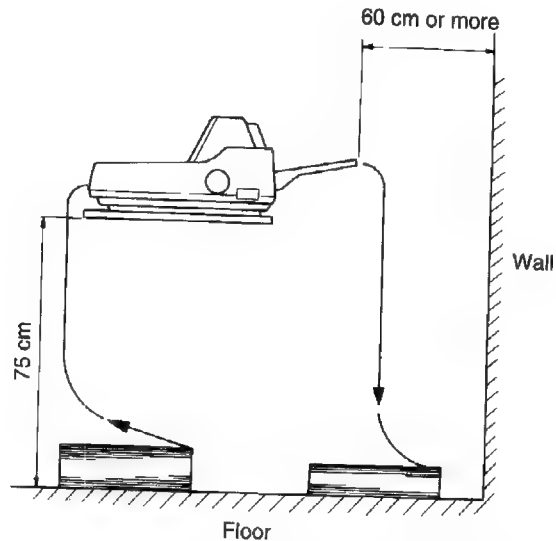


Figure 26. Leave a space at the back of the printer

Running a Self Test

Now that you have installed the ribbon and paper, you are ready to run one of the two types of self test.

Do it any time you want to make sure the printer is functioning properly. The default setting of the paper width is 10.6 inches. When using paper of smaller width, change the width setting to 8 inches by using the MENU MODE. See "Menu Mode (Page 60)".

Printing Demo Patterns

1. Remove the interface cable.
2. Load the paper.
3. Choose the demo pattern you want to check and press the button indicated in the following table.
4. Keep pressing the button and turn on the power. The self test will start in a second.
5. In self test series mode, the printer senses the paper end signal, and stops printing. If you want to interrupt the printing, press the MODE button.
6. When the self test is completed, the SEL light will come on.
7. Connect the interface cable again.
8. Turn on the power switch.
9. Now your printer is ready to receive data from the computer.

No.	Line Feed Group	TOP/ Quiet Print	Position of the Paper Lever	Content of Self Test
1	*		Continuous paper	Demo pattern self test once
2	*		Cut-sheet paper	Demo pattern self test once
3		*	Continuous paper	Rolling ASCII self test series
4		*	Cut-sheet paper	Rolling ASCII self test series

10.6 inch width

[illegible]

The Demo pattern self test.

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LQ-ROMAN 10 CPl
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
pqrstuvwxy/{}~!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-ROMAN PROPORTIONAL
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-SWISS 10 CPl
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
pqrstuvwxy/{}~!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-SWISS PROPORTIONAL
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-COURIER 10 CPl
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
pqrstuvwxy/{}~!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-COURIER PROPORTIONAL
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-PRESTIGE 10 CPl
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
pqrstuvwxy/{}~!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-PRESTIGE PROPORTIONAL
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-GOTHIC 10 CPl
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
pqrstuvwxy/{}~!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-GOTHIC PROPORTIONAL
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-SWISS BOLD 10 CPl
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
pqrstuvwxy/{}~!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

LQ-SWISS BOLD PROPORTIONAL
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

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Note: Check the printout and if you noticed any problems, see Chapter 7, "Troubleshooting".

Follow these steps:

To print menu items.

1. Check the SEL light is on. If it is not, press the SEL button to turn it on. Press the MODE (EXIT) button to set the MENU MODE.
2. To print the menu items, press the TOF/QUIET (PRINT) button.
3. When printing has ended, press the MODE (EXIT) button to cancel the MENU MODE (SEL light goes off).
4. Press the PAPER PARK button to eject paper.

An example of menu items printout:

Font	Print Mode	Courier
Font	Pitch	10 CPl
Font	Style	Italian
Font	Size	Single
General Control	Emulation Mode	IBM 10
General Control	Graphics	On directional
General Control	Max Receive Buffer	8k
General Control	Paper Out Overage	No
General Control	Print Registration	0
General Control	Operator Panel Functions	Full Operation
General Control	Reset Inhibit	No
General Control	Print Suppress Effective	Yes
General Control	Page Width	10.5"
General Control	Exit Flag	1 sec
General Control	Eject Direction	Front
Vertical Control	Line Spacing	6 LPI
Vertical Control	Skip Over Perturbation	No
Vertical Control	Auto LF	No
Vertical Control	Auto CR (IBM)	No
Vertical Control	Auto Feed Xf (IBM)	Invalid
Vertical Control	Page Length	1"
Vertical Control	Sheet Page Length	11 2/3"
Symbol Sets	Character Set	Set 11
Symbol Sets	Code Page (IBM)	US4
Symbol Sets	Language Set	ASCII
Symbol Sets	Zero Character	Unclashed
Symbol Sets	Slashed Letter 0	No
Font	Print Mode	Courier

Note 1: We recommend you run a self test when you change the settings. It will help you to check not only the print quality, but also to use the printout later as a sample.

When you want to initialize the Menu setting, i.e. go back to the default setting, turn the power on while pressing the MODE and SEL buttons.

Note 2: Check the printout and if you noticed any problems, see Chapter 7, "Troubleshooting".

Installing the Optional IC Font Cards

Using optional IC font cards, you can allow the MICROLINE 390 FLATBED printer to print various fonts.

1. Check that the power is off.
2. Hold the IC font card with arrow icon upwards.
3. Insert the card into the slot under the front cover. Make sure to insert the card in the direction of arrow.
4. When you finish using the IC font card, turn off the power before removing.

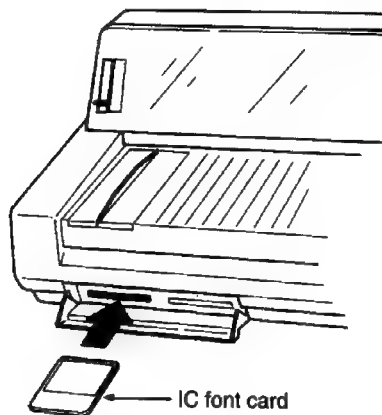


Figure 27. Installing the Optional IC Font Card

Cut-Sheet Feeder

Installing the Optional Cut-Sheet Feeder

When you unpack the Cut-Sheet Feeder, be sure that the following item is included.

- * Cut-sheet unit.

Note: Keep the carton and the packing material in case you store or transport the cut-sheet feeder.

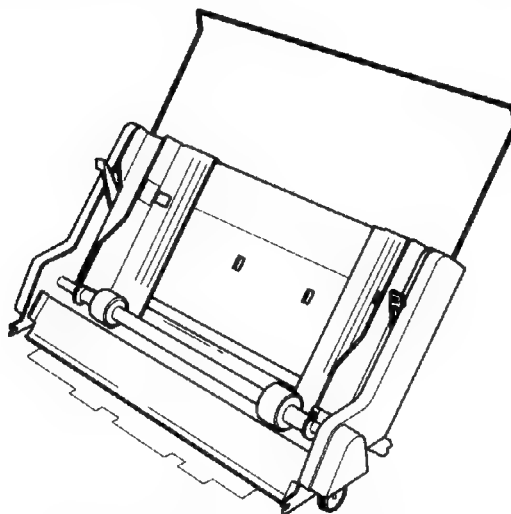


Figure 28. Cut-Sheet Feeder Unit

Mounting the Cut-Sheet Feeder

To mount the Cut-Sheet Feeder on the printer, follow these steps:

1. Make sure the printer is unplugged and turned off.
2. Push the paper lever to forward position.
3. Open the gear cover.
4. Hold both sides of the Cut-Sheet Feeder unit. Place the unit while gently rotating the arms of the unit into the slots as illustrated in Figure 29.
5. Turn the platen knob to make sure that the coupling gear at left-hand side of the cut-sheet unit engages with the idle gear.

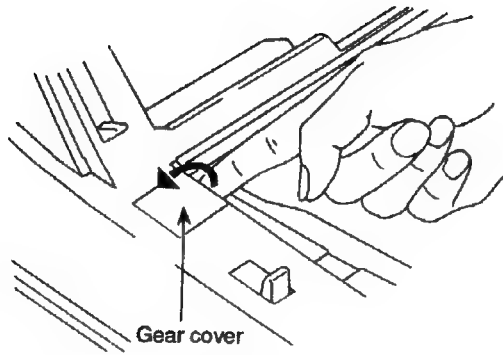


Figure 29-a. Gear Cover

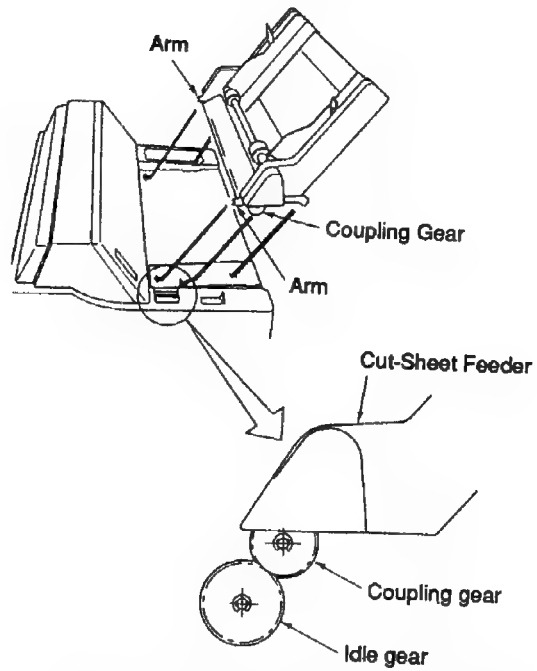


Figure 29-b. Mounting the Cut-Sheet Feeder Unit

Paper Handling Cautions

1. Capacity of the cut-sheet feeder tray (Maximum thickness of a paper stack);

0.256 inches (0.5 mm) for	100 sheets of 50 gm ² (14 pounds) paper
	80 sheets of 60 gm ² (16 pounds) paper
	60 sheets of 75 gm ² (20 pounds) paper
	50 sheets of 90 gm ² (24 pounds) paper
2. A single solid sheet can be handled. Do not use multiple-part paper.
3. Always use paper of the same weight and size.
4. Do not use folded, dog-eared, creased or distorted sheets.
5. Do not leave paper in the loading tray for a long time. The sheets may curl due to change in temperature or humidity.
6. Store packed paper on a flat surface in a cool, dry place until needed. After a package is opened, store the unused paper in a plastic bag to protect it from humidity.

Preparing the Loading Tray

1. Push the paper set lever to the RESET position to load paper.
2. Adjust the paper guide on each side to fit the paper stack.

Loading Paper

1. Flex the paper stack by grasping both ends of the paper into a U-shape. Square the stack again, turn it over, and repeat the operation. Flexing the paper loosens the sheets for better feeding.

A stack of paper is limited to 0.256 inch in total thickness.

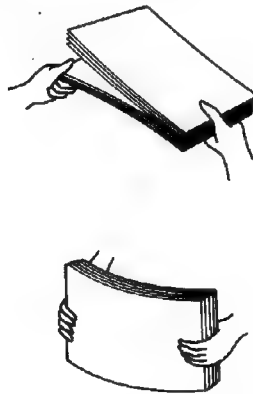


Figure 30. Fan the Paper

2. Insert the paper stack into the tray, then push it against the left paper guide.
3. Adjust the paper guide on each side to the size of paper. Set the position of the right paper guide, then check the left margin of the paper to start printing from required position.
4. Adjust the right paper guide to allow a clearance of 0.5 to 1 mm between the right-hand side of the paper and the right paper guide.

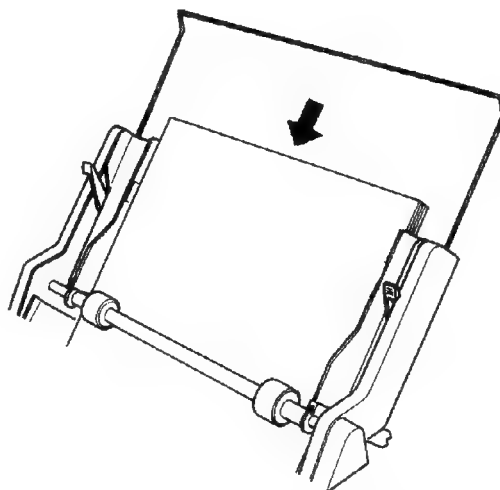


Figure 31. Loading Paper into the Sheet Feeder

5. Push the paper set lever gently to the SET position.

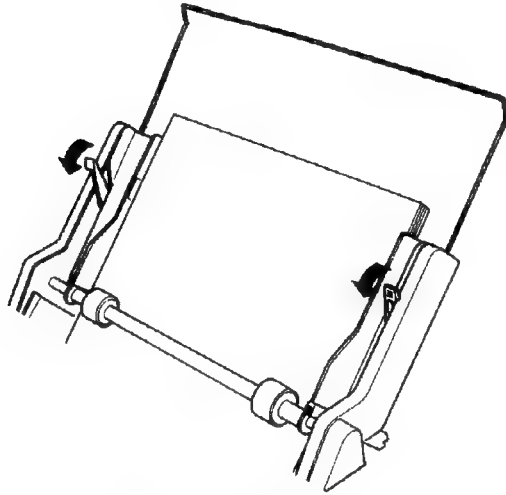


Figure 32. Paper Set Lever

Operation

Cut-Sheet Feeder Controls

The printer's control buttons also control the operation of the Cut-Sheet Feeder. Use programming commands to control the Cut-Sheet Feeder.

Inserting Paper from the Loading Tray

You can advance paper from the loading tray to the print start position by simply pressing the FORM FEED button on the printer.

Paper already in the print position will be ejected when you press the FORM FEED button or use the Cut-Sheet Feeder insert command in a program.

Setting the Top of Form Position

Although the Top of Form (TOF) for the Cut-Sheet Feeder is preset to 0.25 inch (6.35 mm) from the top of the sheet, you can adjust it. To ensure good print quality, however, we suggest that the top margin be at least one inch. If your word processing package automatically inserts a top margin, you should set the Cut-Sheet Feeder top of form position to the top of the paper. In this way, you can use your word processor's default top margin, so you will not have to change the word processor's default margins for every document file you create.

Deselect the printer for this procedure (SEL light off).

To set Top of Form, place the paper in the position you want using one of the methods outlined below.

1. **Standard Line Feed:** Press the LINE FEED button once to feed the paper forwards one line at a time. If you hold the LINE FEED button down, the paper will move forwards continuously in one-line increments until you release the button .
2. **Fine Line Feed:** While holding down the TOF/QUIET button, press FORM FEED to forward the paper, or LINE FEED to reverse the paper.

This moves the paper in very fine increments—1/144 inch to be exact—so you can position the top of form precisely.

LINE FEED can reverse the paper a maximum of 1/3 inch (8.5 mm)

Once the paper is positioned, press the TOF/QUIET button to set that location in the printer's memory. The top of form is recorded permanently—even when the printer is turned off or unplugged—until you reset it.

If no paper is inserted, pressing the TOF/QUIET button sets the top of form position to 0.25 inch from the top of the page, the default setting for the Cut-Sheet Feeder.

Page Margins

For best results we recommend that you maintain minimum page margins as shown in the table in page 12.

Printing with the Cut-Sheet Feeder Controls

After the first sheet is inserted and the Top of Form is set, you can begin printing with the Cut-Sheet Feeder. Simply request a printout from your word processing package as you normally would. When it receives the command to print, the printer will start printing on the inserted sheet, eject the printed page into the stacker, and insert a new page. When files are several pages long, the printer will eject each printed page into the stacker, insert a new sheet from the Cut-Sheet Feeder loading tray, then continue printing.

If you are writing your program for the Cut-Sheet Feeder, you must include the Cut-Sheet Feeder insert and eject commands. When the printer receives the command to print, it will insert a sheet of paper and start printing. Each time it receives the Cut-Sheet Feeder insert command it ejects the printed sheet, then inserts a new sheet.

Use the Cut-Sheet Feeder eject command at the end of your program if you want the printer to eject the printed sheet without inserting a new sheet.

If you want to eject a sheet of paper manually, simply press the FORM FEED button.

For a chart of commands, see Appendix A.

Note: Ensure that the printer's page length is not less than that in your word processing program.

The effect of the LINE FEED command depends on the status of the Cut-Sheet Feeder as follows:

—If there is no paper in the Cut-Sheet Feeder, a sheet will be fed in after a LINE FEED command and the subsequent characters appear on the first print line at the top of the sheet.

—If there is paper in the Cut-Sheet Feeder, the LINE FEED command generates a line feed.

—If the printhead is on the last print line of the sheet, the sheet will be ejected after a LINE FEED and a new sheet fed in. The first printable line of the new sheet is then the actual printing position.

In order to position a new sheet according to the previously selected Top of Form (TOF), you must use the INSERT or FORM FEED command.

Special Cut-Sheet Feeder Operating Situations

When the Cut-Sheet Feeder is installed, any paper in the start position will be ejected whenever the printer is turned on or initialized.

Entering Menu Select Mode

1. Be sure that paper is loaded in the Cut-Sheet Feeder tray.
2. Press the MODE button.

It does not matter whether or not paper is in the printing position. If it is not, the Cut-Sheet Feeder will automatically feed in a sheet.

Starting the Self Test

1. Be sure that paper is loaded in the tray, but not in the print position. (If paper is in the print position, press the FORM FEED button to eject it.)
2. Initiate the self test by using one of the following methods:
 - (a) Press the LINE FEED button while turning on the printer. The Cut-Sheet Feeder will insert a sheet of paper, and eject the sheet to the stacker.
 - (b) Press the TOF/QUIET button while turning on the printer. Cut-Sheet Feeder will insert a sheet of paper and produce a continuous sample of the default style print. It will then eject the sheet, insert a new one and resume printing. This continues until you press the MODE button. Pressing the Mode button stops printing and ejects the paper.

Clearing Paper Jams

Paper jams or misfeeds can occur when sheets stick together or curled corners get caught by the roller. If a paper jam or missfeed occurs while the printer is operating, the printer will stop and be deselected, and the ALARM light will come on. To correct this problem:

1. Remove any paper from the tray of the Cut-Sheet Feeder.
2. Turn the platen knob slowly to remove the jammed paper.
3. Push the SEL button to select the printer. This will cause the ALARM light to go off and the SEL light to come on.
4. Request another printout of the information on the jammed page .

Refilling the Loading Tray

When the loading tray is empty, the ALARM light will come on and the SEL light will go off. To correct this, simply refill the loading tray with a new stack of paper, then press the SEL button.

Cut-Sheet Feeder Command Charts

Programing codes for the following commands are in the tables below:

1. Line Feed. This command makes the printer print a line and skip to the second consecutive line. (When the sheet is at the bottom margin, this command ejects the sheet and then inserts a new sheet and feeds to the printing position and skip to the second consecutive line.)
2. Form Feed. This command ejects the printed sheet. (When the sheet is at the bottom margin, this command ejects the printed sheet, then inserts and positions a new sheet.)
3. Cut-Sheet Feeder Insert. This command inserts and positions a new sheet.
If there is already a sheet in the printer this command will eject that sheet before proceeding to insert the new sheet.
4. Cut-Sheet Feeder Eject. This command ejects the sheet: new sheet is not inserted.

Command Table

Command	ASCII	Decimal	Hexadecimal
IBM and EPSON LQ emulations			
Line Feed	LF	10	0A
Form Feed	FF	12	0C
Cut-Sheet Feeder Insert	ESC EM I	27 25 73	1B 19 49
Cut-Sheet Feeder Eject	ESC EM R	27 25 82	1B 19 52

These printer command are ignored by the printer when the Cut-Sheet Feeder is installed:

- The Paper-Out Sensor command which normally turns the printer's paper-out sensor on or off.
- The Skip Over Perforation command which normally specifies the number of lines skipped at the bottom of one page to the top of the next page.
- The Top of Form command.

Specifications

Heading area: Initial setting is at 0.25 inch (6.35 mm) from the top of paper. It is adjustable in increments of 1/144 inch (0.18 mm) from the top of paper.

Paper feed speed: Approximately 2 inches/second (speed of inserting one sheet of paper).

Line feed speed: Approximately 3.75 inches/second (printer line feed speed).

Paper specifications

Length: 10.1 to 14.3 inches (182 to 364 mm).

Width: 7.2 to 11.7 inches (182 to 297 mm) for Cut-Sheet Feeder.

Ream weight: 14 to 24 lb (52 to 90 g/m²)

Smoothness: 75 to 300 (Sheffield).

Sheet stacker capacity:

Total paper thickness
0.2 inch (5 mm) or less.

Examples: 65 sheets or less
[ream weight: 16 lb (60g/m²)].
50 sheets or less
[ream weight: 20 lb (75g/m²)].

Allowable Margins

Left, right margins:	0.25 inch (6.35 mm)
Top margin:	0.25 inch (6.35 mm)
Bottom margin:	0.25 inch (6.35 mm)

Dimensions of the Cut-Sheet Feeder

Width:	Approximately 14.8 inch (376 mm)
Height:	Approximately 3.6 inch (92 mm)
Depth:	Approximately 9.4 inch (238 mm)
Weight:	Approximately 3.74 lb (1.7 kg)

Environmental Specifications

Humidity

Operating:	40 to 80% relative humidity.
Non-operating storage:	5 to 95% relative humidity.

Temperature

Operating:	10 to 35°C (50 to 95°F).
Non-operating or storage:	-40 to 70°C (-40 to 158°F).

- Notes:** 1. The storage temperature and humidity apply to the Cut-Sheet Feeder when it is packed.
2. The Cut-Sheet Feeder must be free from condensation at any time.

Operating vibrations: 0.3 g (at 10 Hz) or less.

Impact

Not operating:	3 g or less.
Packed:	No damage to the Cut-Sheet Feeder in drop test from 30 inches (76.2 cm) (6 sides, 3 edges, and 1 corner).

Reliability

MTBF:	4,000 hours power-on time (25% duty cycle).
Life:	12,000 hours power-on time or 5 years (25% duty cycle).

Specifications subject to change without notice.

Control Panel Reference

Using the Control Panel

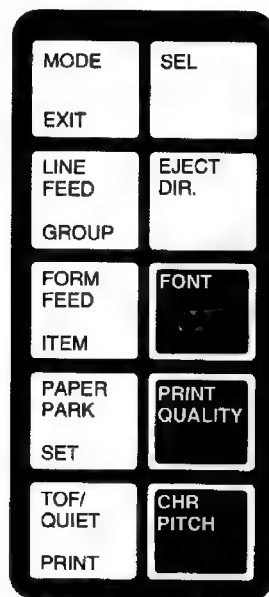


Figure 34. The Control Panel

This selection shows you the buttons and lights on the MICROLINE FLATBED printer's control panel. (Figure 34.) Fingertip operation of these controls allows access to all the features of the printer without the need to change any DIP switches.

Note: All buttons on the control panel are active when the printing mode is either selected or deselected.

Basic Control Buttons

SEL button (Figure 34, top right) has two parts: upper and lower half. The upper part serves as the SEL light, while the lower one serves as ALARM or POWER light.

1. Push the SEL button. (The SEL light comes on.)
Push the SEL button again. (The SEL light goes off.)
2. SEL light: When the SEL light is ON, the printing mode is selected and the printer is ready to receive data from the computer. When the light goes off, the printer is deselected and cannot receive data.

When the SEL light is blinking, the printer is in Print Suppress mode and will ignore all data until the Print Suppress mode is cleared.

3. ALARM light: Red indicates that paper has run out or that there is an internal problem requiring service.
4. POWER light: Amber indicates that the printer is turned on.

Print Characteristics Button

The following buttons allow you to control basic printing features without modifying your software. Simply press a button until the light you want comes on. You can change features when the printer is either selected or deselected.

1. FONT BUTTON

RES: Resident font. The typeface built into the printer (Courier).

CARD: The typeface from the optional IC font card if one is installed (available in Letter Quality (LQ) only).

2. PRINT QUALITY BUTTON

LQ: Letter Quality. High density characters for presentations and formal communications.

UTL: Utility. Higher speed printing for drafts, internal documents, and high-volume data printing.

3. CHARACTER PITCH BUTTON

10, 12, 15, 17, 20: The five different sizes of the characters indicated in Characters Per Inch (CPI). 10 CPI(pica) and 12 CPI (Elite) are used for standard text; 15, 17 and 20 CPI are used to print more information on a page, in a spreadsheet, for example.

Each character pitch varies following the printing surface of each character, for example, "i" requires, smaller pitch than "w" does. This improves legibility and gives a better "typeset" look.

The MODE Button

The MODE button controls the functions of the remaining four buttons as follows:

Control Buttons on the Panel

MODE button	PRINT mode (MODE light is off)	MENU SELECT mode (MODE light is off)
2nd button	LINE FEED	GROUP
3rd button	FORM FEED	ITEM
4th button	PAPER PARK	GROUP
5th button	TOF/QUIET	PRINT

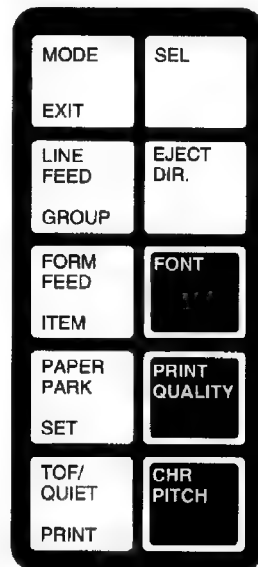


Figure 35. Control Panel

PRINT Mode

When the mode light is off, the printer is in the PRINT mode. (If the light is on, press the button to turn it off.)

In this mode, you can get the following functions by pressing the four buttons.

1. **LINE FEED** button: Advance the paper by one line.
2. **FORM FEED** button: Advance the paper to the first line of the next page.

When the paper lever is set to the Cut Sheet Position, the paper ejection operates.

3. **PARK** button: When printing continuous paper, it retracts the continuous paper in order to load a cut-sheet. (See Page 21 for details.)
4. **TOF/QUIET** button: It allows you to set the top of form (first line of the page).

When the printer is selected, you can enter the QUIET mode ("QUIET" lights comes on). This mode reduces the printing noise by slowing the speed. Press the button again while printing, to go back to normal operation.

MENU Mode

In this special mode, you can change various settings and customize your printer. These settings will be active whenever you turn on the printer. The settings will remain in effect until you change them through software commands or the MENU mode.

Note: The settings overridden by computer commands or the front panel commands will be cancelled when turning off the printer.

To change the settings, follow these steps:

1. Load the ribbon and the paper.
2. Press the MODE button. The SEL light goes off, the MENU light comes on.
3. Now press the GROUP button. The current setting will be printing as follows:

Font shows the group, Print Mode shows the item, LQ Courier shows the setting. This means the current setting is LQ Courier.

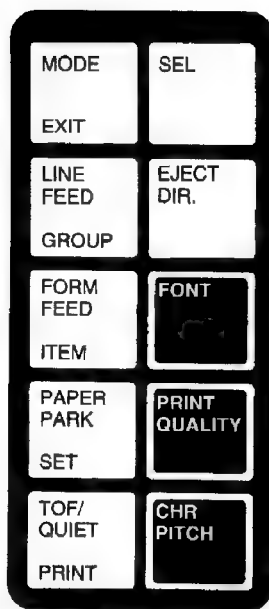


Figure 36. Control Panel

4. See the table of setting (Page 63), and press GROUP, ITEM and SET button until you get the desired setting.
 5. Press the PRINT button to print out and confirm the setting you have just changed.
- Note:** We would recommend that you print out the setting whenever you change it, in order to use later as a reference.
6. When you have gone through every setting you want to change, press the MODE button to save it.

For example:

1. If you want to change the font style to Italics, when the current setting is Normal, follow these steps.

–Start with the first setting.

Font	Print Mode	Courier
------	------------	---------

–Press the ITEM button twice to get the Style settings.

–Press the SET button once to get the Italics setting.

–Press the PRINT button to print out.

Font	Style	Italics
------	-------	---------

2. If you want to change your current ASCII language set to Japanese language set, follow these steps:

–Start with the first setting.

Font	Print Mode	Courier
------	------------	---------

–Press the GROUP button three times to get the Symbol Sets settings.

–Press the ITEM button three times to get the Language Set setting.

–Press the SET button eight times to get the Japanese setting.

–Press the PRINT button to print out.

Symbol	Language Set	Japanese
--------	--------------	----------

The settings can be reset to the default (factory) settings by turning on the power, while pressing both the SEL and MODE buttons.

Table of MENU Mode Settings

Factory settings are marked with an asterisk.

Group	Item	Setting
Font	Print Mode	Courier *
		Roman
		Letter Gothic
		Prestige Elite
		Swiss
	Pitch	Swiss Bold
		Utility
		Font Card
		10 CPI *
		12 CPI
	Style	15 CPI
		17.1 CPI
		20 CPI
		Proportional
		Normal *
	Size	Italics
		Single *
		Double
		EPSON LQ *
		IBM PPR
General Control	Emulation Mode	IBM X24 AGM
		Unidirectional *
		Bidirectional

	Max. Receive Buffer	8K * 23K 40K (Option) 1-Line
	Paper Out Override	Yes No *
	Print Registration	0 * -1 -2 -3 -4 -5 +5 +4 +3 +2 +1
	Operator Panel Functions	Full Operation * Limited Operation
	Reset Inhibit	Yes No *
	Print Suppress Effective	Yes * No
	Page Width	10.6" * 8"
	Wait Time	1 Sec * 2 Sec 500 ms
	Eject Direction	Front * Rear
Vertical Control	Line Spacing	6 LPI * 8 LPI

Form Tear Off	Yes* No
Skip Over Perforation	Yes No *
Auto LF	Yes No *
Auto CR (IBM)	Yes No *
Auto Feed XT (Epson)	Valid Invalid *
Page Length	11" 11 2/3" 12" * 14" 17" 3" 3.5" 4" 5.5" 6" 7" 8" 8.5"
Sheet Page Length	11" 11 2/3" * 12" 14" 17" 3" 3.5" 4" 5.5" 6" 7" 8" 8.5"

Symbol Sets	Character Set	Set I Set II * EPSON
	Codepage (IBM)	USA * Multilingual Norway Portugal Turkey Greek 928 (optional IC font card) Greek 851 (-ditto-) Greek 437 (-ditto-)
	Language Set	ASCII * French German British Swedish I Danish I Italian Spanish I Japanese Norwegian Danish II Spanish II Latin America French Canadian Dutch Swedish II Swedish III Swedish IV Turkish Swiss I Swiss II Publisher
	Zero Character	Unslashed * Slashed
	Slashed Letter O	No * Yes

List of Menu Mode Settings

Print Mode: Choose Courier for the built-in letter quality font, Font Card for an optional IC font card, or Utility for high-speed printing.

Pitch: Choose character width in Characters Per Inch (CPI), or proportionally spaced characters (available in Letter Quality mode only) (See Page 85).

Style: Choose Normal (upright) or Italics (slanted).

Size: Choose Single or Double width and height.

Emulation Mode: Choose the command set available either in Epson LQ series, IBM Proprinter 24/2124 or IBM AGM, so that you can reproduce it on your MICROLINE 390 FLATBED.

Graphics : Choose unidirectional (left to right only) mode for better graphics print registration at slower speed. Choose bidirectional mode for higher speed printing.

Paper Out Override: The paper out detector senses the remains of paper and stops printing when the stack become less than one inch thick. By choosing YES, you can override this system and continue printing.

Make sure not to print after paper was out, as you may print on the bare platen and lose data.

Print Registration: Use this item together with the bidirectional mode graphics to improve registration. Most users are satisfied with 0 degree, but it will also help to choose another degree when you have any problems with your graphic applications (See Page 64).

Operator Panel Functions: FULL OPERATION is the normal setting. Choose LIMITED OPERATION to deactivate the FONT, PRINT QUALITY, CHARACTER PITCH, and MODE buttons on the control panel. Then you can control these features only through your software. This can be useful when several people share one printer and you want to save your own settings. If you want to reactivate the buttons, turn off the printer, then keep pressing the MODE button and turn on the printer again. Follow the normal MENU MODE procedures to reset this item to the full operation.

Page Width: 10.6 inches is the default setting of printing width. You can also choose 8 inches for smaller sheets.

Wait Time: After inserting cut-sheet, one second later (as default wait time) the printer is ready to start printing.

Eject Direction: Choose FRONT for the paper ejection in a forwards direction, Choose REAR for reverse direction.

Line Spacing: 6 LPI means 6 lines per inch and corresponds to the 1/8 line spacing. Choose 6 LPI or 8 LPI i.e. 1/8 line spacing.

Forms Tear Off: Use this item to turn the forms tear off feature On or Off. When the feature is active, you can easily remove continuous-form paper from the printer without wasting paper.

Skip Over Perforation: Choose YES if you want the printer to advance automatically to the next page. It will break the page when the lower margin becomes less than one inch. If your software has its own page formatting controls, choose NO to avoid interference.

Auto LF: Choose YES to order the printer to issue a Line Feed command automatically each time it receives a Carriage Return command. The choice depends on whether or not your computer can command a Line Feed. If your printout is consistently double spaced, select NO. If it overprints, choose YES.

Auto CR: Choose YES to have the printer automatically add a Carriage Return to each Line Feed command it receives. This feature is used only in IBM emulations.

Auto Feed XT: Choose VALID to have the printer automatically feed a line length to each Carriage Return command it has received. This feature is used only in EPSON emulation mode.

Page Length: Choose the length following the size of your paper. This enables the printer to keep the top of form constant.

Sheet Page Length: Same command as above but for cut-sheet paper.

Character Set: See Appendix B for IBM Character Set 1, Set 2 and EPSON character set.

Code Page Option: The Code Page option is only valid when IBM Mode is selected. The Code Page must be selected in the MENU MODE when using the optional IC font cards which contains the Code Page option for the resident Courier font. See Appendix B.

Note 1: All of the printing modes available in the Courier font are available when the Code Page option is selected. As for all Font Card characters, only the Letter Quality printing mode is available.

Note 2: The Code Page option must be set to USA (Code Page 437) in order to access the National Character Sets (See Appendix B) by using the ESC ! n command or through MENU MODE.

Note 3: The Multilingual Code Page (850) has several international characters in place of many of the mathematical symbols and line graphics found in the All Character Set. The other Code Page option consists of characters which are more specific to the requirements of an individual country, for example Code Page 865 (Norway).

Language Set: These sets replace certain symbols with special characters used in the respective foreign languages. (See Page 97).

Zero Character: Choose SLASHED when you want to distinguish the zero from the capital letter O.

Slashed Letter O: Two symbols ¢(155) and ¥(157) will be replaced by ø and Ø, if you choose YES.

Computer Control

This chapter explains the basic control skills using the two major operating systems:

- MS-DOS
- BASIC

DOS Commands for Printing ASCII Text Files

DOS commands can be used when your software does not control the printing features.

There are three DOS commands for printing ASCII text files:

- PRINT filename
- TYPE filename > device name
- COPY filename device name

PRINT Command

With this command, you can work on your computer while printing.

Note: PRINT is not exactly a DOS command. When using this command, the file PRINT.COM must be on one of your disks.

Example

In this example, we are going to print a file called NOTES.TXT, which is on the WORK subdirectory of the computer's hard disk drive (drive C:). The PRINT.COM program file is in the main (root) directory of the C: drive.

After the > prompt, begin with:

```
print c:\work\notes.txt [RETURN]
```

You will see this display on your screen:

```
Name of list device [PRN]:
```

If your printer is connected to the parallel printer port, (LPT1:) press [RETURN]. If it is connected to another port (LPT2:, COM1:, or COM2:), type the name of the port and press [RETURN].

Then with this display, the printing will start:

```
Resident part of PRINT installed  
C:\WORK\NOTES.TXT is currently being printed.
```


Note: If you are not sure of the port, press the RETURN key and specify [PRN]. The device name PRN refers to LPT1: (the default DOS port). This is the most common printer port.

Once you have used a PRINT command, DOS system will “remember” the name of the port and will not ask you again. Of course, turning off or restarting the computer will erase this information from memory.

TYPE command

If you do not have a copy of PRINT.COM available, you can use TYPE command to redirect the file to your printer.

Example

```
type c:\work\notes.txt > lpt1
```

Note: If you are not using the LPT1: port, substitute “lpt1” for the current port type.

COPY command

Just like the copy feature between disks or directories, you can copy a text file to the printer.

Example

```
copy c:\work\notes.txt lpt1
```

Note: If your port is not LPT1:, substitute “lpt1” for the current port type.

Changing the Default Printer Port

If your system does not use the LPT1: port, you can specify which port DOS should use as its default. At the DOS prompt, enter the appropriate MODE command(s).

Interface

Serial interface

The serial interface is used to transmit the data sequentially to the printer. For this feature, purchase the serial interface board (option) from your dealer.

First enter:

```
MODE COM 1:9600, N,8,1,P
```

Then enter:

```
MODE LPT1:=COM1:
```

Parallel Interface

The parallel interface is used to transmit the multiple bits of data simultaneously.

Enter:

```
MODE LPT2:
```

Note 1: If your serial interface is COM2:, type COM2: instead of COM1:, or LPT3: for the LPT3 interface.

Note 2: To avoid re-entering the MODE command(s) every time, save them in your computer's AUTOEXEC.BAT file. To create an AUTOEXEC.BAT file or edit an existing one, use a text editing or word processing mode. When editing your system's AUTOEXEC.BAT file, be sure not to change or delete anything already in the file.

Note 3: For more information about AUTOEXEC.BAT files, see your DOS manual.

DOS Based Software

Your MICROLINE 390 FLATBED Printer is designed to emulate three different types of printer: the Epson LQ series, the IBM Proprinter X24/XL24, and the IBM Proprinter X24/XL24 AGM (Alternate Graphics Mode). Select the setting of General Control/Emulation Mode (See Page 63) to emulate those printers.

Most of recent software connects with these standard printers. So, all you have to do is to match your printer emulation with the software's setting.

Changing the Software's Driver

There are too many software packages to give you the details of installation, and modifying drivers.

So, if you have decided to customize your software's driver, use the descriptions of the control codes in Chapter 5 to get an idea of what kind of features you can add to it and the codes you will need to control these features.

Prior to work on the driver, make a backup copy. Then add or modify the features and settings of the driver.

Basic Programming

The LPRINT command in BASIC sends the data to the printer rather than to the screen. Send your command to the printer, by enclosing it with double quotes.

For example,

```
LPRINT "A line of text"
```

Prints the current line, and then moves to the beginning of the next line. If you do not want this automatic carriage return and line feed, put a semicolon (;) after the data:

```
LPRINT "A line of text";  
LPRINT "... and this text is on the same line"
```

Keep in mind, however, that this BASIC command automatically adds a carriage return and line feed after the 80th character in a line. If necessary, you can use a WIDTH statement to change the number of the character.

For serial printers

If you are using your printer with a serial interface, you must redirect the output from the computer to the serial port you are using, either COM1: or COM2:, rather than to the default port, LPT1:. There are two ways to redirect this output:

1. If you are using DOS, you can use the MODE command, as described on Page 76. Then, use the LPRINT command in your BASIC programs as usual.
2. You can also redirect the output to COM1: or COM2: from within BASIC, by opening the port as a file and printing your data to that file. If you want to run any programs described in this Handbook, you must modify them including one of these statements:

```
OPEN "COM1:9600,N,8,1" AS #1
```

```
or
```

```
OPEN "COM2:9600,N,8,1" AS #1
```

To print data, use the PRINT #1 command (remember to include a comma between the #1 and the data.)

```
PRINT #1, "A line of text"
```

Like the PRINT command, PRINT #1, automatically moves the print position to the next line unless you use a semicolon (;).

When you send an LPRINT statement, the text between the quotation marks is converted to a string of numbers, which are then processed by the printer which then outputs the characters in the form of dot patterns. Each character will then be assigned a numeric value according to the American Standard Code for Information Interchange (ASCII). Since ASCII is a standard coding system, most computers, printers and other electronic devices interpret it.

There are 256 ASCII codes varying from 0 to 127 which are standardized (apart from minor exceptions), while the codes 128 - 255 are used in a less standard way to represent other characters. The table of ASCII codes in Appendix B shows the ASCII codes 0 - 127.

Although most of the ASCII codes represent alphanumeric and punctuation symbols, you will notice that the codes from 0 to 31, as well as 127, do not correspond to normal characters. These are control codes, reserved for the control of a wide range of peripheral equipment, i.e. monitors, modems, programming devices or the printers themselves.

Some of the control codes do not represent any character on your keyboard, and you cannot send them to the printer by enclosing in double quotes, as you did with the text. Instead, you must use the CHR\$ function, which sends the character in the form of the decimal or hexadecimal value. For example, the Escape character will be represented as CHR\$(27), or, in hexadecimal, as CHR\$(&H1B). (Notice that hexadecimal numbers in BASIC are preceded by &H to distinguish them from normal letters or decimal numbers.)

Of course, you can also use the CHR\$ function to output printable characters. For instance, CHR\$(65) represents the letter A. However, it is usually easier to type letters, numbers and punctuation marks, in order to make your BASIC programs much easier to be read when using literal characters, enclosed in quotes, or whatever possible symbols.

Another use for the CHR\$ function is to send the value you are assigning to the variable in a printer command. Some commands oblige you to fill in a numeric value, representing tab stops, line spacing, etc. These values must be given as the argument in a CHR\$ function.